RESEARCH PAPERS

Integrating Public Health and Primary Care

Intégrer la santé publique et les soins primaires

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Abstract

Purpose: Improved health and social outcomes would be possible with better coordination and collaboration between public health and primary care. The purpose of this study is to identify linkages between these health sectors with the aim of informing a forward-looking policy approach to integrate public health functions in primary care.

Methods: We searched national and international journals and the grey literature for relevant papers and reports published from January 1999 to December 2003. The final set of documents provided broad coverage of the topic, with emphasis on national and international representation and a special focus on disease surveillance, health promotion, accident and illness prevention and chronic diseases.

Results: Three main findings emerged from this study. First, there is a need to understand and clearly articulate the roles and functions of public health and primary care in Canada. Second, the main areas of overlap between these sectors are health surveillance, health promotion and prevention of disease and injury. Third, based on an international literature search, we identified 10 models that demonstrate how these sectors can be integrated; five of them were developed in Canada.

Conclusions: National and international evidence and a variety of working models support the integration of public health functions in primary care. Canada has been a leader in developing models of integrated health systems that combine individualized approaches to influence personal health behaviour and community approaches to influence the health of the population. These integration models could be further developed through a focus on the common need of primary care and public health to address the health implications of the ever-present risk of emerging infectious diseases in Canada.

Résumé

Objectif : Il y aurait possibilité d'amélioration sur le plan social et de la santé si une meilleure coordination et une plus grande collaboration entre les domaines de la santé publique et des soins primaires existaient. Le but de cette étude est de cerner les liens entre ces secteurs afin de contribuer à l'élaboration d'une approche progressiste d'intégration des pratiques de santé publique dans les soins primaires.

Méthodes : Nous avons effectué des recherches dans des revues nationales et internationales et dans la littérature grise pour repérer des articles et des rapports pertinents publiés entre janvier 1999 et décembre 2003. Le groupe de documents retenus offrait

une excellente vue d'ensemble du sujet, avec un accent sur la représentation nationale et internationale et une attention particulière à la surveillance des maladies, à la promotion de la santé, à la prévention des accidents et des maladies et aux maladies chroniques.

Résultats : Trois principales conclusions se sont dégagées de cette étude. Premiérement, il y a un besoin de comprendre et de définir clairement les rôles et les fonctions dans les domaines de la santé publique et des soins primaires au Canada. Deuxièmement, les principaux points de chevauchement entre ces secteurs sont la surveillance des maladies, la promotion de la santé et la prévention des accidents et des maladies. Troisièmement, à la suite d'une analyse de la documentation internationale, nous avons repéré dix modèles d'intégration de ces secteurs, dont cinq ont été élaborés au Canada.

Conclusions : Des preuves nationales et internationales et une variété de modèles fonctionnels appuient l'intégration des pratiques de santé publique dans les soins primaires. Le Canada a joué un rôle de chef de file dans l'élaboration de modèles de systèmes de santé intégrés qui combinent des approches individualisées visant à influencer les comportements personnels liés à la santé, d'une part, et des approches communautaires axées sur la santé de la population, de l'autre. Il serait possible de développer davantage ces modèles d'intégration en se concentrant sur les besoins communs des secteurs de la santé publique et des soins primaires, afin de faire conjointement face aux répercussions, pour la santé, du risque toujours présent de l'émergence de nouvelles maladies infectieuses au Canada.

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A *family physician in Ottawa was very glad she was up to date on local pandemic preparedness, having participated in a program promoting best practices in respiratory infection control (Hogg and Huston 2005; Hogg et al. 2006; Huston et al. 2006). Late one Friday afternoon, a 47-year-old man came into her office looking quite ill and in moderate respiratory distress. The receptionist asked the routine questions on cough and fever, gave him a mask, instructed him to clean his hands with alcohol-based hand gel and placed him directly in an examining room. The physician was notified and conducted her history and physical exam wearing a mask and using meticulous hand hygiene.*

The man had a one-day history of fever, cough, myalgias and mild stomach upset. He was a professional who lived in a rural area and ran a small farm. Closer questioning revealed he had free-range chickens. Most of them had died a few days earlier and the man had disposed of them. The physician knew there had been a recent announcement about an H5N1 outbreak in wild birds in Southern Ontario. She realized the free-range chickens could have been infected by wild birds with H5N1 and that this could be the first human

case of H5N1 in Canada. She immediately called the local medical officer of health and then the infectious disease specialist to arrange transfer to hospital.

The local medical officer of health agreed that H5N1 was a possibility, alerted the provincial Ministry of Health and arranged to meet the patient in a negative-pressure room at the hospital to conduct a thorough contact history. The provincial Ministry of Health alerted the Public Health Agency of Canada, which alerted the Canadian Food Inspection Agency. Within hours, viral swabs were obtained and sent to the provincial laboratory, and the patient was started on antiviral medications. Within 48 hours, all household contacts were receiving antiviral medications and were under voluntary quarantine. The Canadian Food Inspection Agency quarantined the farm and culled the remaining chickens. The diagnosis of H5N1 in the 47-year-old man was soon confirmed by the National Medical Laboratory in Winnipeg. In concert with provincial officials, the Public Health Agency of Canada announced this information through professional networks and in the media. In compliance with the International Health Regulations, the Agency notified the World Health Organization.

This fictitious scenario highlights the benefits of integration and collaboration between primary care and public health. Indeed, much has been written about the need to reform the public health system, both in Canada and internationally (Government of Canada 2003; Health Canada 2003; CIHR 2003; IOM 2003; Institute for the Future 2003; Ridoutt et al. 2002). Recent world events such as the 2003–2004 outbreak of Severe Acute Respiratory Syndrome (SARS) have exposed our vulnerability to global health issues and underlined the need for a healthcare system that is effectively integrated, both domestically and internationally. The Canada Public Health Agency (Public Health Agency of Canada 2007b) was recently created to address one of many concerns and recommendations from the report of the National Advisory Committee on SARS and Public Health (Health Canada 2003), and a national "think tank" has examined the future of the public health system in Canada (Frank and Di Ruggiero 2003; CIHR 2003).

Historically, public health and primary care have shared a common goal: a healthy population (Lubetkin et al. 2003). Yet, public health and primary care have had separate identities, in the views of healthcare professionals and the public (Institute for the Future 2003). Moreover, in characterizing the relationship among primary care, family physicians and the public health system during the SARS crisis, Dr. David Naylor suggested that there are "weak links between public health and the personal health services system, including primary care, institutions, and home care" (Public Health Agency of Canada 2004).

Such weak links imply a need to better integrate public health and primary care. But what is meant by integrated care? Kodner and Kyriacou (2000: 2) define integrat-

ed care as "a discrete set of techniques and organizational models designed to create connectivity, alignment and collaboration within and between the cure and care sectors at the funding, administrative and/or provider levels." Results of a workshop on the topic of integrated care held at the 2005 European Social Network Conference in Edinburgh suggest that integrated care has different meanings for various stakeholders, including the user, frontline provider, manager and policy maker. For example, the user might perceive integrated care as care that is "seamless, smooth, easy to navigate," whereas to the policy maker, it implies consolidating budgets and conducting joint policy evaluations (Lloyd and Wait 2005: 9).

Not only can integration have different meanings to different users; it also occurs at different levels of the healthcare system. Delnoij et al. (2002) specifies integration at the macro, meso and micro levels of the healthcare system. *Functional integration* occurs at the macro level and involves the financing and regulation of cure, care and prevention activities of both sectors. At the meso or community level, there are two types of integration: *organizational integration* and *professional integration*. The former implies a strategic alliance or merger between public health and primary care. The latter suggests that such mergers involve healthcare professionals working together, for example, in group practices. Finally, at the micro level there is *clinical integration*, which involves continuity, cooperation and coherence of healthcare delivery to individual patients.

At its meeting on future strategic directions for primary healthcare, the World Health Organization (WHO) indicated that "the emphasis placed on community participation and intersectoral collaboration is especially appropriate now, when so many health issues … cannot be effectively addressed by health systems working in isolation" (2003: 16). The WHO report on the meeting suggests a new approach to integrating systems: strengthening public health functions in primary healthcare settings. This approach could improve local public health surveillance and reinforce disease prevention and health promotion. To facilitate an intersectoral approach between primary care and public health, the WHO report suggests some interesting and useful ideas:

- Give more prominence to the public health functions within primary care.
- Use leaders to promote intersectoral collaboration.
- Use evidence to demonstrate that important health and social outcomes can be achieved only through intersectoral collaboration.
- Involve intersectoral stakeholders in agreeing on health goals and priorities.
- Build the mechanisms for collaboration at every level, from national to local.
- Integrate health into definitions and processes of wider community development.
- Develop appropriate attitudes towards collaboration and power-sharing.
- Develop influencing skills among primary care professionals and managers at the local level.

In this paper, we begin by outlining the essential functions of primary care and public health. We identify the areas where these overlap and where there is the greatest potential for the two systems to work synergistically to improve population health. Finally, we summarize, through a literature review, models in which such integration occurs and offer suggestions for the future development of these models.

A systematic scan was conducted of published national and international journal articles focused on the integration of primary care and public health to identify research reports published from January 1999 to December 2003. Literature was identified through a comprehensive search of English-language publications in PubMed. We used controlled vocabulary and text words for the concepts of "public health" (including population health, health promotion, disease surveillance and emergency response), "primary care" (including continuity of patient care and patient-centred care) and "organization and administration" (including linkages, integration and partnerships). "In process" and publisher-supplied records were also included. Key articles and authors were identified, and further articles were located by linking to similarly indexed records. Grey literature was also sought by searching key websites, scanning tables of contents of relevant documents and by general Internet searching using Google.

Basic Characteristics of Public Health and Primary Care

Table 1 outlines basic characteristics of public health and primary care.

TABLE 1. Basic characteristics of public health and primary healthcare

CHARACTERISTICS	PUBLIC HEALTH	PRIMARY HEALTHCARE
Definitions	• "The combination of sciences, skills, and beliefs that is directed to the maintenance and improvement of the health of all the people through collective or social actions. The programs, services, and institutions involved emphasize the prevention of disease and the health needs of the population as a whole." (Last 1995)	"[E]ssential health care based on practical, scientifically sound and socially acceptable methods and technology made universally accessible to individuals and families in the community through their full participation and at a cost that the community and country can afford to maintain at every stage of their development … . It is the first level of contact of the individual, the family and the community with the national health systems … and constitutes the first element of a continuing health care process." (WHO 1978)

TABLE 1. Continued

CHARACTERISTICS	PUBLIC HEALTH	PRIMARY HEALTHCARE
Primary Mission	• Health of the community (Novick and Mays 2001)	• Health of the individual & family members
Essential Functions	• Population health assessment • Health surveillance • Health promotion • Disease & injury prevention • Health protection (CIHR 2003) • Disaster response (PHAC 2004)	• Diagnosis & treatment of medical conditions, including counselling, pharmacotherapy, minor surgical procedures • Health promotion & preventive care • Maternal & child care, including obstetrics • Emergency care • Rehabilitative care • Palliative care • Patient advocacy • Participation in community health programs • Education & health advocacy (CMA 1994)
Attributes/ Principles	10 Guiding Principles: • Public good • Determinants of health • Equity/diversity & social justice • Partnership • Public participation • Interdisciplinary approaches • Science-based • Efficient/cost-effective • Continual improvement • Sustainability (CPHA 2001)	• "To provide all Canadians, wherever they live, with access to an appropriate health care provider, 24 hours a day, 7 days a week." (Health Canada 2003)
Personnel	• Public health nurses • Public health physicians • Laboratory personnel • Infection control practitioners & hospital epidemiologists • Infectious disease specialists • Epidemiologists • Other public health workers, e.g., public health inspectors, dental hygienists, health promotion specialists (PHAC 2004)	• Family physicians or general practitioners • Nurses • Nurse practitioners • Mental health workers • Pharmacists • Others working in multidisciplinary team-based practices (e.g., physiotherapists, dieticians)

TABLE 1. Continued

CHARACTERISTICS	PUBLIC HEALTH	PRIMARY HEALTHCARE
Skills	• Epidemiology & health services investigation/ research • Designing, launching and maintaining public health programs and interventions • Report & policy writing • Administration • Communication with professionals • Committee services work (van Ree 2004)	• Investigation & management of clinical problems • Consultation & communication • Small-group leadership skills • Practice management • Medical audit (van Ree 2004)
Evaluation/ Research Emphasis re: Effectiveness & Efficiency of Services	• Evaluate structure, process & outcome of services • Based primarily on epidemiology & demographic data & on economic concepts • Focus on disease causes; means of disease prevention; processes & outcomes of healthcare (van Ree 2004)	• Audit of clinical work & practice organization • Based partly on subjective views of staff & patients • Focus on management of common health problems, & on structure & processes of primary healthcare delivery (van Ree 2004)

Public health has been defined as "the combination of sciences, skills, and beliefs that is directed to the maintenance and improvement of the health of all the people through collective or social actions. The programs, services, and institutions involved emphasize the prevention of disease and the health needs of the population as a whole" (Last 2005). However, definitions of the term public health and its essential functions are not universal. The Standing Senate Committee on Social Affairs, Science and Technology reports that the term "public health" is confused with "publicly funded healthcare" and is seen as the opposite of private healthcare (Government of Canada 2003). Hence, the Committee adopted an alternative term, "health protection and promotion," which describes some of the core functions or defining activities of public health.

A worldwide trend in public health is the attempt to define the essential functions of the public health system (CIHR 2003). No official list exists in Canada. The Canadian Institutes of Health Research (CIHR) sees a critical need for Canada to reach a consensus on the core functions of public health as a starting point to define, assess and develop linkages among system infrastructures. Reports from both CIHR and the National Advisory Committee on SARS and Public Health refer to the list prepared by the Advisory Committee on Population Health (ACPH) (CIHR 2003;

Health Canada 2003). This is the list we have used for the essential functions of public health (Table 1). The National Advisory Committee on SARS and the ACPH have added "disaster response" to the list of essential functions for public health (Health Canada 2003).

Perhaps the most widely accepted definition of primary healthcare is that provided in the Alma Ata Declaration:

> … essential health care based on practical, scientifically sound and socially acceptable methods and technology made universally accessible to individuals and families in the community through their full participation and at a cost that the community and country can afford to maintain at every stage of their development … . It is the first level of contact of the individual, the family and the community with the national health system … and constitutes the first element of a continuing health care process. (WHO 1978)

Hall and Taylor (2003) note that the WHO's definition of primary healthcare incorporated coverage of basic health services such as education on methods of preventing and controlling health problems; promotion of proper nutrition; sanitation; maternal and child health; vaccination, prevention and control of endemic disease; appropriate treatment of common disease and injuries; and provision of essential drugs. Van Ree (2004) suggests that the "Health for All" call made by the WHO conference in Alma Ata failed to achieve many of its aims, most notably because of the need to better integrate primary care and public health efforts to reach these goals.

The list of essential functions for primary care as defined by the Canadian Medical Association (CMA 1994) is comprehensive, ranging from health promotion to palliative care. This list is now more than a decade old and may need to be revisited in light of current activities and new developments under primary care reform. For example, in light of recent past and emerging infectious diseases, some consideration needs to be given to integrating the role of primary care with public health in areas such as disease surveillance and disaster response.

The Link between Primary Care and Public Health

Table 2 provides a model that describes the features and functions of public health and primary care. The model outlines three main categories, including those that are (1) primarily the responsibility of public health, (2) a joint function of public health and primary care and (3) primarily the responsibility of primary care. The second category includes health surveillance, health promotion and prevention of disease and injury, the areas in which public health and primary care are more closely linked and have the greatest potential for integration.

TABLE 2. Features and responsibilities of primary care and public health

FEATURES	PRIMARY RESPONSIBILITY			
	PRIMARILY THE RESPONSIBILITY OF PUBLIC HEALTH		JOINT FUNCTION OF PUBLIC HEALTH AND PRIMARY CARE	
FUNCTIONS	POPULATION HEALTH ASSESSMENT	HEALTH PROTECTION	HEALTH SURVEILLANCE	HEALTH PROMOTION
Sample Interventions	• Health needs assessment • System report card	• Restaurant inspections • Child care facility inspections • Water treatment monitoring • Air-quality monitoring & enforcement	• Health surveys • Disease registries • Communicable disease reporting • Ongoing analysis of data • Report to practitioners of increasing threat, what they need to look for & intervention required • Report to public health re: suspected emerging infectious diseases • Disaster response	• Intersectoral community partnerships to solve health problems • Advocacy for health public policies (e.g., income, education, housing) • Improving personal skills • Creating physical & social environments to support health (e.g., bike paths)
Intervention Objectives	• Identify population health needs • Report on health status	• Identify & ameliorate health & safety risks	• Identify trends or emerging problems • Activate screening & protection protocols to reduce outbreaks	• Prevent movement to at-risk group
Main Target Groups for Intervention	• General population	• General population	• General population • At-risk groups & individuals	• General population • At-risk groups & individuals
Level of Prevention	• Primary prevention	• Primary prevention	• Primary & secondary prevention	• Primary & secondary prevention

Source: Adapted and modified from National Public Health Partnership 2001.

TABLE 2. Continued

FEATURES	PRIMARY RESPONSIBILITY	
	JOINT FUNCTION OF PUBLIC HEALTH AND PRIMARY CARE	PRIMARILY THE RESPONSIBILITY OF PRIMARY CARE
FUNCTIONS	DISEASE & INJURY PREVENTION	DISEASE MANAGEMENT
Sample Interventions	• Immunizations • Investigation & outbreak control • Encouraging & supporting healthy behaviours (e.g., healthy eating, exercise, not smoking) • Chronic disease prevention (e.g., cancer screening)	• Treatment & acute care • Management of complications • Rehabilitation • Maintenance & follow-up • Self-management • Continuity of care
Intervention Objectives	• Prevent movement to established disease or hospitalization	• Prevent/delay progression to complications & prevent admission & readmissions to hospital or other treatment facilities. • Continuity of care
Main Target Groups for Intervention	• General population • At-risk groups & individuals	• Individuals with established disease
Level of Prevention	• Primary & secondary prevention	• Tertiary prevention

Health surveillance

Responsibility for health surveillance is one of the most important functions of public health (IOM 2003) and an area of increasing significance and potential for putting public health practice into primary care (Griffiths and Haslam 2002; Kahan et al. 2003). The National Advisory Committee on SARS and Public Health defines health surveillance as "the tracking and forecasting of any health event or health determinant through the continuous collection of high-quality data, the integration, analysis and interpretation of those data into surveillance products (for example reports, advisories, alerts, and warnings), and the dissemination of those surveillance products to those who need to know" (Health Canada 2003). The report suggests that surveillance data can come from at least four types of sources including surveys, administrative reports, special-purpose data and clinical records.

The link between public health and primary care is most obviously found in clinical data, which are criti-

cal for surveillance purposes (Health Canada 2003). First-contact providers are the first to see new and emerging diseases, acting as "sentinels" for the public health system (Health Canada 2003: 35). However, at the present time Canada does not have an integrated surveillance system that allows timely information to be reported upward through the public health hierarchy from local primary care providers to national and global networks (Health Canada 2003). Furthermore, for family physicians to fulfill their public health role in surveillance during an infectious disease outbreak, they require "protocols, protective equipment and prompt information" (Health Canada 2003: 36). Some protocols exist for possible emerging illnesses, for example, Ontario's guidelines for preventing febrile respiratory illnesses (Ontario Ministry of Health and Long-Term Care 2006).

Timely detection depends on rapid communication from frontline healthcare providers to public health officials. Priority has been placed on the development and implementation of electronic health records (EHRs), which will help to remedy the communication gap (Health Canada 2003; First Minister's Meeting 2000). Furthermore, the Network for Health Surveillance in Canada lists several activities, such as the development of priority information systems, to support an integrated public health and primary care system (Public Health Agency of Canada 2007a). It also plans to help develop the skills needed to undertake health surveillance and to interpret surveillance data.

Health promotion

Health promotion is defined as "the enabling of people to increase control over, and to improve, their health. To reach a state of complete physical, mental and social well-being, an individual or group must be able to identify and realize their aspirations, to satisfy needs and to change or cope with the environment" (CIHR 2003). "Health promotion contributes to and shades into disease prevention" through healthy public policies, community interventions and public participation (Health Canada 2003).

Health promotion has been viewed historically as an important domain for physicians (CMA 1995). Results from the literature report very little on the scope, boundaries and intersection between public health and primary care in this area, making it difficult to identify specific activities in primary care that might contribute to integration most effectively and efficiently. Furthermore, health promotion is underfunded compared to spending on other aspects of healthcare in Canada (Government of Canada 2003). It is reported that health promotion is practised by governments, non-governmental organizations and primary care service providers in a fragmented and poorly integrated fashion. No health goals have been set nationally for health promotion.

If primary care and public health professionals have integrated roles in health promotion, then they both need access to timely information concerning regional and

community health concerns. They also need to be made aware of current trends in evidence-based health promotion activities. Effective and efficient methods of team-based interventions are required whereby physicians, public health nurses and other health professionals involved in primary care delivery have an identified and manageable role to play in health promotion. They also need to be adequately compensated for this role.

Prevention of disease and injury

Canadian society has placed increasing emphasis on disease and injury prevention, as seen in recent federal reports (Commission on the Future of Health Care in Canada 2002; Government of Canada 2003). For example, Romanow recommends a larger investment in prevention and health promotion activities within the healthcare system (Commission on the Future of Health Care in Canada 2002). His report calls for the integration of prevention and promotion initiatives as a central focus of primary care, targeted initially on reducing tobacco use and obesity and increasing physical activity in Canada. It also calls for a National Immunization Strategy.

There is also growing recognition in Canada that prevention should focus more on chronic diseases. The report of the Standing Senate Committee on Social Affairs, Science and Technology (Government of Canada 2003) recommended the development of a National Chronic Disease Prevention Strategy that should incorporate public education efforts, mass media programs and policy development. Such a strategy could be implemented through various public health settings, including primary care, and could address the needs of priority groups (e.g., Aboriginal peoples).

Sample Models of Integration

How best to integrate public health services within primary care is a concern in many countries (Palmer et al. 2003; Tountas et al. 2002; Herdman et al. 2002; Tatara 2002; Eskin 2002; Lewis 1999; Donaldson 2002). Ten models were identified in our literature review (see Table 3). Models varied in their level of implementation. For example, the United Kingdom's Public Health in Primary Care Trusts was the only model found that focused on national-level implementation imposed from top levels of government down to providers. Five models were introduced at the community level. There were three models at the patient–provider level that were more narrowly focused on the relationship between a public health department and primary care providers. Notably, five models were developed in Canada, a finding that may reflect the growing national interest in developing this capacity.

TABLE 3. Summary characteristics of integration models reviewed

MODEL	BRIEF DESCRIPTION OF MODEL	LEVEL OF IMPLEMENTATION (PATIENT–PROVIDER, COMMUNITY, PROVINCIAL OR NATIONAL)	STAGE OF DEVELOPMENT (PLANNING, EARLY STAGE OF IMPLEMENTATION, FULLY IMPLEMENTED, DISCONTINUED)	FOCUS OF MODEL (CHRONIC DISEASE PREVENTION, GENERAL INTEGRATION, TARGETED PREVENTION OR CARE DELIVERY, INFECTION CONTROL)
Canada				
1. Quebec: Centres Locaux de services communautaires (CLSCs) (CIHR 2003; Hutchison et al. 2001)	• Formalized collaboration of public health & primary care within a provincial network of CLSCs & Quebec's Public Health Act (CIHR 2003).	• Provincial	• Fully implemented	• General integration
2. Ontario: a. Primary Care & Public Health Links in Hamilton (Hill et al. 2001)	• Collaborative working initiative between public health & family medicine (through McMaster University). Two integration models were developed: Heart Health & Public Health Nurse Secondment.	• Patient–provider	• Fully implemented	• General integration with some focus on chronic disease prevention (i.e., heart health in seniors)
b. Primary Health Care Practice Facilitation (PF) for Preventive Services in Eastern Ontario (Lemelin et al. 2001; Baskerville et al. 2001)	• PF model is a flexible, tailored & multifaceted approach that selects & trains nurses as practice facilitators to assess, plan & provide assistance to physicians & staff in practice change.	• Community	• Demonstration project that has been discontinued	• Targeted prevention or care delivery
c. Outreach Facilitation Model Applied to Infection Control (Hogg and Huston 2005; Hogg et al. 2006; Huston et al. 2006)	• Authors applied the PF model to infection control using public health nurses. Approach led to a 50% improvement in respiratory infection control measures in 53 family physicians' offices.	• Patient–provider	• Demonstration project that has been discontinued	• Infection control

TABLE 3. Continued

3. Alberta: The Crowfoot Experience (Aufricht 2004)	• Crowfoot practice has a public health nurse located at the physician's office to perform Well Baby assessments and child visits.	• Patient–provider	• Fully implemented	• Targeted prevention or care delivery
Australia				
1. Preventing Chronic Disease: A Strategic Framework (National Public Health Partnership in Australia 2001)	• Australian model is presented for chronic disease prevention to strengthen the interface between public health & primary healthcare. Model is consistent with the WHO's Global Strategy for Prevention & Control of Non-Communicable Diseases.	• Community	• Planning stage	• Chronic disease prevention
2. Smoking, Nutrition, Alcohol & Physical Activity (SNAP) (Joint Advisory Group on General Practice and Population Health 2001)	• Australia also has an integrated model to support the management of behavioural risk factors of SNAP in general practice (Joint Advisory Group on General Practice and Population Health 2001).	• Community	• Planning stage (expected to be implemented in 2006–2011)	• Chronic disease prevention
United Kingdom				
1. Public Health in Primary Care Trusts (Griffiths and Haslam 2002; Heller et al. 2003; DOH 2001, 2002; Holland 2002; Sim and Mackie 2002)	• Recent structural changes in the National Health Services (NHS) in England have placed public health in Primary Care Trusts (PCTs) & will change the way primary care operates (Griffiths and Haslam 2002; Hutchison et al. 2001).	• National	• Early stage of implementation	• General integration
Netherlands				
1. Hartslag Limburg (Limburg Heartbeat) Program (van Ree 2004)	• This model integrates public healthcare & private medical care (primary healthcare & cardiologists at the local hospital). The model was selected by WHO as a demonstration project on the collaboration between public health & general practice in the field of cardiovascular prevention.	• Community	• Fully implemented	• Chronic disease prevention

TABLE 3. Continued

Community-Oriented Primary Care Model (COPC) (Mullan and Epstein 2002; Illiffe and Lenihan 2003; Illiffe et al. 2002; Gillam and Schamroth 2002; Busby et al. 1999; Longlett et al. 2001, 2002; Pickens et al. 2002; Geiger 2002; Cashman et al. 1999)	• COPC model is "a continuous process by which primary care is provided to a defined community on the basis of its assessed health needs through the planned integration of public health practice with the delivery of primary care services" (Mullan and Epstein 2002). COCP was originally conceptualized in the 1940s by Sidney Kark in South Africa (Illiffe and Lenihan 2003). Today much has been published about COPC, most notably in the UK (Illiffe and Lenihan 2003; Gillam and Schamroth 2002; Illiffe et al. 2002; Busby et al. 1999) & the US (Longlett et al. 2001, 2002; Pickens et al. 2002; Geiger 2002; Cashman et al. 1999).	• Community	• Fully implemented	• General integration

Models differed in their stage of development and focus. Some were at the planning stage in which policies or directives were newly created by a group or committee, with plans for implementation in the near future. Some models were in early stages of implementation, while others were more fully implemented and had also been evaluated. Most models focused on the general integration of public health functions in primary care, usually integrating chronic disease prevention within primary care settings. Only one model considered infection control.

Finally, it is worth noting that the only US model of integration was Community-Oriented Primary Care. Instead of focusing on integration, the United States seems to be concerned with dividing the responsibilities for healthcare delivery between the public health and medical services. For example, a reduction in the direct delivery of healthcare services by local public health agencies is seen as consistent with a national effort to have government public health agencies refocus their attention to population-based public health (IOM 2003). There has also been a shift from health departments to private providers for childhood immunizations, including the purchase and distribution of vaccines. It is unclear how the United States links public health agencies with family physicians.

In summary, the literature offers only modest guidance on how to integrate public health and primary care systems; however, there is clearly demonstrated interest in exploring different models in Canada. Now may be a good time to capitalize on this indication of interest to advance the Canadian integration agenda. Public health authorities and primary care providers may be more open to cooperation than in the past. The SARS crisis revealed how difficult it would be for public health and primary care professionals to respond separately when the next pandemic strikes. Both primary care reform and public health renewal are priorities in strengthening Canada's health system (Commission on the Future of Health Care in Canada 2002; Health Canada 2003; Government of Canada 2003). In all jurisdictions, stakeholders have been engaged in widespread debate about the future of primary care services delivery, and substantive changes are underway. New priorities and new approaches to resourcing primary care have the attention of service providers.

What might an optimal integration model look like? Models such as the Family Health Teams in Ontario or Primary Care Networks in Alberta deserve careful consideration. They involve multidisciplinary or interprofessional team practices including public health and primary care providers; capitated, salaried or blended models of remuneration for family physicians; a funding system or incentives program for health surveillance, health promotion and prevention of disease and injury; a rostered patient population; and a frontline information technology system to collect health promotion and disease prevention data continuously and systematically, as well as the capacity to detect and report new and emerging diseases.

We believe that a reasonable starting point is interprofessional collaboration in the primary care setting, with the goal of enhancing the quality of care (Commission on the Future of Health Care in Canada 2002; Health Council of Canada 2005). Delnoij et al. (2002: 1) suggest that we have now entered the "fourth stage of epidemiological transition characterized by ongoing degenerative or chronic diseases." This stage calls for a different organization of healthcare services delivery that shifts emphasis from acute care to monitoring and prevention, for which multidisciplinary teamwork may help.

We also call for further collaboration of primary care and public health in the specific area of emerging infectious diseases. In light of HIV/AIDS, West Nile virus, Marburg fever, SARS and novel influenza viruses, emerging infectious diseases are unlikely to go away. Models to address new diseases at both the clinical and population-based levels are needed. Table 4 identifies how primary care providers, public health professionals and laboratory personnel have complementary roles in detecting and responding to emerging infectious diseases. Increasingly, these groups will need to be linked together by common plans and protocols using common databases and information systems; they will also need to be guided by an understanding of the interfaces among local, provincial, national and international health systems.

TABLE 4. Example of primary care–public health collaboration: detection, reporting and early containment of emerging infections

PROFESSIONALS	ROLE
Primary Care Family physician Primary care nurse Nurse practitioner	• Infection control • Early detection • Prompt reporting • Case management
Public Health Local Medical officer of health Public health nurse Public health inspector Epidemiologist Provincial Communicable disease specialist Epidemiologist National Communicable disease expert epidemiologist	• Public/professional education • Outbreak investigation and control • Surveillance and reporting • Contact history and follow-up • Public health measures (e.g., quarantine)
Laboratory Provincial Viral laboratory technologists Federal Viral laboratory technologists	• Accurate testing • Reporting

Conclusion

Starfield (2003) indicates that one of the main challenges for primary care is to make the transition from the individually centred care of the 20th century to a population-based care for the 21st century. She asserts that this transition will happen through partnerships. Partnership between public health and primary care requires a clear articulation of the roles and functions of each sector in Canada. Options about how the two might intersect in a practical and meaningful way will likely need to consider several issues such as the determinants of health, illness as co-morbidity, prevention and health promotion as positive functions of healthcare, collaborative practices, the influence of primary care reforms and the need to be proactive in addressing emerging infectious diseases. Indeed, the ultimate fit between primary care and public health will be shaped through applied models that demonstrate what works best for the healthcare professionals involved, what produces the best results for the health of the population and what is acceptable policy for governments.

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